

WHAT IS CLAIMED IS:

1. A composite magnetic body, comprising:
metallic magnetic powder; and
thermosetting resin,
wherein the composite magnetic body has a packing ratio of the
metallic magnetic powder of 65 vol% to 90 vol% and an electrical resistivity
of at least $10^4 \Omega \cdot \text{cm}$.
2. The composite magnetic body according to claim 1, wherein the
packing ratio of the metallic magnetic powder is 70 vol% to 85 vol%.
3. The composite magnetic body according to claim 1, wherein the
metallic magnetic powder contains, as a main component, a magnetic metal
selected from Fe, Ni, and Co and, as a subsidiary component, a non-magnetic
element in a total amount not exceeding 10 wt%.
4. The composite magnetic body according to claim 1, wherein the
metallic magnetic powder contains at least one non-magnetic element
selected from Si, Al, Cr, Ti, Zr, Nb, and Ta.
5. The composite magnetic body according to claim 1, further
comprising an electrical insulating material other than the thermosetting
resin.
6. The composite magnetic body according to claim 5, wherein the
electrical insulating material comprises an oxide film formed on a surface of
the metallic magnetic powder.
7. The composite magnetic body according to claim 6, wherein the
oxide film contains at least one non-magnetic element selected from Si, Al,
Cr, Ti, Zr, Nb, and Ta.
8. The composite magnetic body according to claim 7, wherein the
oxide film has a thickness of 10 nm to 500 nm.
9. The composite magnetic body according to claim 5, wherein the

electrical insulating material contains at least one selected from an organic silicon compound, an organic titanium compound, and a silica-based compound.

5 10. The composite magnetic body according to claim 5, wherein the electrical insulating material is a solid powder with a mean particle size not exceeding one tenth of that of the metallic magnetic powder.

10 11. The composite magnetic body according to claim 5, wherein the electrical insulating material is plate- or needle-like particles.

12. The composite magnetic body according to claim 11, wherein the plate- or needle-like particles have an aspect ratio of at least 3/1.

15 13. The composite magnetic body according to claim 11, wherein the plate- or needle-like particles have a mean largest-diameter of 0.2 to 3 times a mean particle size of the metallic magnetic powder.

20 14. The composite magnetic body according to claim 11, wherein the plate- or needle-like particles contain at least one selected from talc, boron nitride, zinc oxide, titanium oxide, silicon oxide, aluminum oxide, iron oxide, barium sulfate, and mica.

25 15. The composite magnetic body according to claim 5, wherein the electrical insulating material is at least one selected from fatty acid salt, fluororesin, talc, and boron nitride.

30 16. A magnetic element, comprising:
a composite magnetic body comprising metallic magnetic powder and thermosetting resin and having a packing ratio of the metallic magnetic powder of 65 vol% to 90 vol% and an electrical resistivity of at least $10^4 \Omega \cdot \text{cm}$; and

a coil embedded in the composite magnetic body.

35 17. The magnetic element according to claim 16, further comprising a second magnetic body when the composite magnetic body is defined as a first magnetic body,

wherein the second magnetic body has a higher magnetic permeability than that of the first magnetic body.

18. The magnetic element according to claim 17, wherein the coil and the second magnetic body are disposed so that a closed path passing through inner and outer sides of the coil via the second magnetic body alone is not formed.

19. The magnetic element according to claim 17, wherein the second magnetic body is at least one selected from ferrite and a dust core.

20. A method of manufacturing a magnetic element comprising a composite magnetic body containing metallic magnetic powder and thermosetting resin and having a packing ratio of the metallic magnetic powder of 65 vol% to 90 vol% and an electrical resistivity of at least $10^4 \Omega \cdot \text{cm}$, and a coil embedded in the composite magnetic body, the method comprising:

obtaining a mixture including metallic magnetic powder and thermosetting resin present in an uncured state;
obtaining a molded body by pressure-molding the mixture to embed the coil; and
curing the thermosetting resin by heating the molded body.

21. The method of manufacturing a magnetic element according to claim 20, further comprising, before curing the thermosetting resin, heating the mixture containing the metallic magnetic powder and the thermosetting resin present in the uncured state in a range between 65°C and 200°C.

22. The method of manufacturing a magnetic element according to claim 20, further comprising granulating the mixture containing the metallic magnetic powder and the thermosetting resin present in the uncured state.

23. The method of manufacturing a magnetic element according to claim 20, wherein the thermosetting resin whose main component in the uncured state is powder at ordinary temperature is mixed, without being dissolved in a solvent, with a remaining portion of the material containing the metallic magnetic powder.

24. The method of manufacturing a magnetic element according to claim 20, wherein the main component of the thermosetting resin is a liquid at ordinary temperature.

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